How to Fit Prostaglandin Into Your A.I. Program

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With the increased use of artificial insemination in the beef industry, many purebred producers and commercial cow-calf producers have made great genetic progress with their herds. It seems imperative, if the beef cattle industry is to compete in future years for a fair share of the consumer meat dollar, it will have to continue to make genetic progress and improve reproductive efficiency. Currently only approximately 5% of all beef cows are bred artificially, but for genetic progress to continue, this percentage may need to increase.

What are the keys to making an A.I. program work? Can the clearance of Lutalyse, a new prostaglandin compound, to synchronize heat help in developing a successful A.I. program?

First, let's visit about some of the key points to consider in planning an A.I. program.

1. Why use artificial insemination?

Before entering the A.I. program, it is important that cow-calf producers—whether purebred or commercial—determine why they want to use A.I. and how they plan to make it work. Do they have the opportunity to utilize genetic seed stock they would not otherwise use? What goals do they hope to achieve by using A.I.? All of these things must be considered, and once the commitment is made, cattlemen need to start planning.

2. Attend a successful A.I. school.

Most of the people who do the inseminating in the cattle industry have been trained by one of the A.I. companies in their well-taught A.I. schools. And even those who have had some training at home generally will benefit immensely from attending an A.I. school. Knowledge of the proper procedures for handling semen and proper procedures for inseminating cows is a must for a successful A.I. program. Even for those people who have already inseminated cattle for a few years, it is often advantageous to go back and attend an A.I. school as a refresher course to correct any bad habits. Research has shown that even experienced inseminators may do a poor job of depositing semen in the proper location in the female reproductive tract.

3. Evaluate the facilities available at your farm or ranch.

Once goals have been set and training completed, the next thing to evaluate is the facilities necessary to get the job done. They don't need to be fancy but they do need to be functional. They need to prevent an undue amount of stress on the cow and on the individual doing the inseminating and handling. If you have never seen a good A.I. facility, get together with some of the A.I. industry people and take a look at some of the facilities being used by successful cattle producers.

4. Do an inventory well in advance of the breeding season on what your A.I. needs are.

This inventory needs to include a number of things. First, you need to inventory your cows and how many you plan to inseminate. Evaluate the general condition and thriftiness of the cows. Is the nutrition program going to be adequate for those cows to be cycling at the start of the breeding season? The inventory needs to include how much semen is going to be needed, and orders need to be placed well in advance of the breeding season.

5. Develop a schedule and get organized.

In planning your breeding season, set up a time schedule well in advance and develop a check list of things to accomplish in the next 30, 60, 90 or 120 days. If you plan to utilize a synchronization program, which can be very helpful in reducing the amount of time spent on heat detection, you need to decide what system to use. Will you use the 2-injection system 11 days apart? If so, this must fit into the time schedule. Do you plan to heat detect for five days and then inject cows that have not cycled? If you plan to synchronize 100 cows or heifers, you could have anywhere from 50 to as many as 75-80 in heat in a very short period. How will you handle these cows when they come in heat? Do you have adequate labor to heat detect if you're breeding on heat detection and not on timed insemination? Do you have a facility where you can sort off heifers or cows detected in heat and hold them for evening or morning breeding? Our experience with cooperating herds in Kansas is that, once a synchronized female is detected in heat, it is best to remove her from the herd and put her in an area where she can settle down before breeding.

A well-planned well-organized A.I. program that includes synchronization can run very smoothly, with excellent results. A poorly planned one can lead to unsatisfactory results.

Next, let's determine what it takes to effectively use the synchronization compound Lutalyse. During the past year, we worked with 25 cooperating ranches in Kansas and summarized the results in 18 of the herds. In general, we were extremely pleased with the potential synchronization offers in reducing the labor associated with heat detection in the A.I. program. What were the possibilities and problems associated with our use of Lutalyse in Kansas?

Possibilities

Following the clearance of prostaglandin (Lutalyse), we initiated a project in conjunction with the UpJohn Co. to evaluate different systems of using prostaglandin (Lutalyse) in synchronizing both cows and heifers. The summaries of the 18 cooperating ranches in Kansas involved 945 mature cows and 520 yearling heifers. A number of different systems of using prostaglandin were followed; however, the most common was to heat detect for five days, inject the cows that had not cycled, then breed either upon observing heat or 80 hours after injection. In some of the herds, the 2-injection system 11 days apart was used, with the cows or heifers bred upon showing heat or 80 hours after the second injection. In one herd, all the heifers were injected, with those showing heat after the first injection being bred and those not showing heat given a second injection and then bred upon showing heat or 80 hours after the injection. No particular system appeared to offer advantages in terms of overall effectiveness, so ranchers should use the system that best fits their breeding programs. The greatest effect on conception rate was not due to method but to variations from one ranch to the next.

Of those cows showing heat, first-service conception rate averaged 57%, which was considered acceptable by most cooperating ranchers. This first-service conception rate is fairly consistent with the over-all sum-

Table 1. REPRODUCTIVE PERFORMANCE OF THREE KANSAS COW HERDS

	Herd 1	Herd 2	Herd 3
Number of Cows	41	40	40
Length of Breeding Season (Days)	45	107	135
Percent Cows Cycling by:			
21 Days of Breeding Season	98%	45%	35%
30 Days of Breeding Season	98%	58%	50%

mary of many trials prepared by UpJohn, which showed a conception rate of 61% for 1,844 lactating beef cows and 55% for 1,614 beef heifers.

The results of our field trials substantiate that first-service conception rates will be normal using a variety of injection schemes. Likewise, most of the cooperating ranchers found that the extra management and labor associated with giving the injections either once or twice presented very few problems.

Problems

The key, however, to the degree of success and satisfaction obtained with using prostaglandins was the percent of cows or heifers cycling. In herds with a high percentage of females cycling, virtually complete satisfaction was expressed. However, unfortunately, in a high percentage of the herds, lack of cycling females limited success of the synchronization program.

Previous data has given strong indication that a high degree of variability exists among herds in regard to percent of cows cycling early in the breeding season. In Table 1, reproductive data on either 40 or 41 cows was collected in three different Kansas herds. The percent cycling in the first 30 days of the breeding season was determined by twice daily heat checks. In one herd, which used a short breeding season and an excellent nutrition program, 98% of the cows cycled the first 21 days. By contrast, in Herd 3 where a long breeding season was used, only 35% of the cows cycled the first 21 days of the breeding season.

In field trials conducted on the 18 cooperating ranches, 12 ranches had cows that were synchronized. Based on either observing heat or palpation in 945 cows, only 46.2% were cycling. Eleven of the 18 ranches sychronized heifers as part of the trial, and of 520 yearling heifers, only 68.6% were observed in heat or determined to be cycling based on palpation. These figures were surprisingly low, and it was initially suspicioned that a fairly high percentage of the cows may have been cycling but simply did not manifest heat. In examining the results in seven of the herds where cows or heifers not observed in heat were bred on 80-hour timed insemination, a small percentage conceived, indicating that there definitely were some females ovulating but not manifesting estrual activity or else not showing enough signs to be detected.

One Problem

These results clearly indicated that one of the major problems facing the cattle industry in attempting to utilize prostaglandins is lack of cycling or estrual activity in the beef female early in the breeding season. Not only is this a problem in attempting to synchronize cows but also it is one of the major reproductive problems facing the cattle industry. One of the goals of any commercial cattle producer or even many purebred producers should be to have a high percentage of cows conceive early in the breeding season. The goal should be to have 60-65% of the cows conceive the first 21 days of the breeding season. Yet in many cases it is very apparent that we may be lucky to have 60-65% of the cows cycling, and even with a conception rate of 60-65%, it is apparent that we would be lucky to have 35-40% of the cows bred early in the breeding season.

It also should be noted that the 18 herds involved in the Kansas study represent some of the top herds in the state, with nearly all of them having used artificial insemination in the past. Thus, figures reported on the percent of cycling females at the start of the breeding season in these herds probably would be considerably higher than in the cattle industry in general.

In examining the cycling data more closely, there was a wide degree of variation from herd to herd, which is shown in the range in Table 2. In mature cows with suckling calves, it would appear that probably at best only 75-80% will be cycling; unfortunately, a figure of 45-50% is fairly common. In yearling heifers, there generally was a higher percentage cycling, with a common figure of 65-70% showing heat.

There are many reasons why cows fail to show heat early in the breeding season. Let's examine some of these.

Table 2. REPRODUCTIVE PERFORMANCE OF COOPERATING HERDS

	Cows	Heifers
Number of Herds	12	11
Number of Females	945	520
Percent Females Cycling*	46.2%	68.6%
Range in Percent Cycling Activity	19.4%-77.8%	37.5%-97%

**Based on observed heat or rectal palpation*

1. Nutrition levels.

The key to getting a high percentage of cows cycling early in the breeding season obviously relates to nutrition, particularly energy levels before calving and energy levels immeditely after calving. Research trial after research trial clearly has shown that restricting the level of energy by as little as 10% before cows calve will reduce the percent cycling by 10-30%. Severe energy restrictions such as a 30-40% reduction in TDN levels can even reduce the percent of cycling cows by 40-50%. This research has shown that one of the major influences of pre-partum energy levels will be on the interval to first estrus. However, post-partum energy levels also have been shown to influence the percent of cows cycling at start of the breeding season. This influence is usually less dramatic than pre-partum nutrition but still has some influence.

The way most cow herd operators evaluate the effectiveness of their nutrition program is condition of the cows. Recent research reported by Wiltbank and co-workers clearly has shown that condition at calving time will influence the percent of cows cycling early in the breeding season.

In our trials, it was not possible to score condition at calving. However, 477 cows from seven herds were condition-scored at the start of the breeding season. The cows were scored on a scale of one to 10 (one being extremely thin and 10 extremely fat). Cows that condition-scored three and four had only 24.3% cycling. Cows in this condition would be classified by any cattleman as thin. Particularly disappointing was the fact that of the 477 cows, 201 or 42% fell in this classification. In contrast, when the cows had a condition score of five, which is considered to be average condition, 50% were cycling; when they carried a condition score of six, seven or eight, 64.7% were cycling.

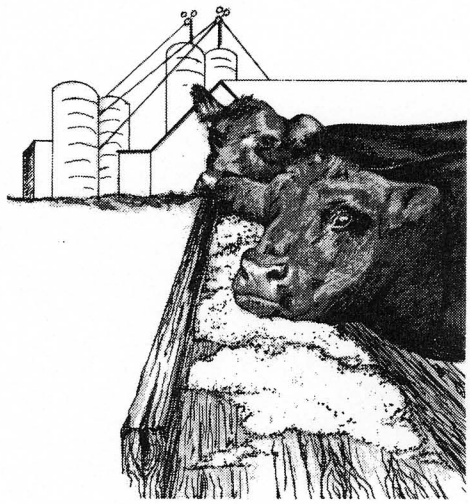
2. Days Post-partum.

In order for a high percentage of cows to be cycling at the start of the breeding season, adequate time must elapse after calving. Lactating mature cows are going to require 30-50 days and lactating first-calf heifers 40-70 days to start cycling after calving. Even in a short 60-day breeding season, a cow that calves late (such as at the end of this 60-day period) often will only have 20-30 days from the time she calves until the start of the breeding season. In contrast, if the average length of breeding season is 120 days, a fairly high percentage of cows will not have even calved by the start of the breeding season.

In a 1976-77 Kansas survey involving 350 producers, average length of the breeding season was 134 days. Only 23.4% of the reporting ranches had a 60-day or shorter breeding season.

Table 3. EFFECT OF CONDITION AT START OF BREEDING SEASON ON PERCENT OF BEEF FEMALES CYCLING

Condition Score	Number Heifers and Cows	Percent Exhibiting Estrus
3, 4	201	24.3%
5	208	50.0%
6, 7, 8	68	64.7%



In the trial at the 18 cooperating ranches, the effect of days post-partum on percent of cycling cows becomes fairly evident. Information was available on 223 cows. As is shown in Table 4, for those cows with less than 60 days elapsing since calving, only 34% were cycling. For those cows more than 90 days post-partum, 73% were cycling.

Table 4. EFFECT OF DAYS POST-PARTUM ON CYCLING ACTIVITY OF COWS

Days Post-partum	Number Cows	Percent Cycling
Less than 60	50	34%
60-90	121	43%
More Than 90	52	73%

3. Age of the beef female.

A factor influencing cycling activity will be age of the beef female. As already has been indicated, a considerably higher percentage of yearlings were cycling at the start of breeding than were mature cows. Research trials consistently have shown that first-calf heifers require considerably more time to cycle than mature cows. Often it will take those heifers at least 20 days longer to initiate first post-partum estrus than is the case for their mature counterparts.

In the trial with the 18 cooperating ranches, at only two were we able to get a good comparison of cycling activity of first-calf

heifers compared to mature cows. At one of the ranches, only 35.9% of the first-calf heifers were cycling at the start of the breeding season. In contrast, 77.8% of the cows three years or older were cycling. At another cooperating ranch, 65% of the first-calf heifers were cycling, while 86.7% of the mature cows three years and older were cycling at the time of synchronization.

Appropriately, improving reproductive efficiency is often cited as one area where the beef cattle industry must make progress. It becomes very clear from the data collected with the 18 cooperating ranches that one major way to improve reproductive efficiency is to shorten post-partum interval to create a higher percentage of cows cycling at the start of the breeding season.

No Easy Solutions

There probably are no easy solutions to the problem, but following a sound nutrition program and shortening length of the breeding season are things any cow-calf producer can empahsize.

A sound nutrition program obviously is built around getting the right nutrients in the cow at the critical time. In order to have a high percentage of the cows cycling early in the breeding season, feeding adequate levels of TDN starting at least 50 days before calving and 120 days post-calving is extremely important. Also, it is important to have a proper blend of nutrients; in addition to putting emphasis on TDN, proper levels of protein, phosphorus, calcium and vitamin A must be considered in planning a cow herd nutrition program.

Once a sound nutrition program is launched, emphasis must be placed on a short breeding season. The initial place to put emphasis is on heifers, and (as many producers are not doing) using only a 45- or at most a 60-day breeding season for yearling heifers is a good place to start shortening length of the breeding season. Likewise, gradually reducing length of the breeding season on mature cows by a few days each year can lead to a desired 60-80-day breeding season.

Genetic Profiles Sponsors Animal Measuring Meets

Genetic Profiles is sponsoring a series of seminars for cattlemen to introduce its concept of evaluating beef cattle through linear measurements.

Norman Hayes, founder and general manager, reports that each 2-day seminar will fully explain the theory of measuring livestock and will illustrate how today's progressive cattlemen can benefit from applying measuring to their own operations.

Entitled "Man Must Measure," the seminars will feature Dr. Earl Butz, former Secretary of Agriculture and dean emeritus of Purdue University, who will give the keynote address on innovative management in beef production for the 1980s. Each seminar will include lectures by Dr. Jan Bonsma, South African animal scientist who first utilized measurements to determine functional efficiency of beef cattle, and Dr. Cas Maree, head of the Animal Science Dept. at the University of Pretoria, South Africa.

Hayes will host the measuring seminars along with Dr. Burl Winchester, who was the first to apply the measuring system to livestock in this country. They will be held in 14 locations during 1981, beginning in Kansas City April 5-6. Other locations include Tulsa, Ft. Worth, Houston, Orlando, Fla., Nashville, Columbus, Ohio, Minneapolis, Denver, Springfield, Ill., Atlanta, Las Vegas, Nev., San Francisco and New Orleans.

For more information, cattlemen may contact Genetic Profiles, P.O. Box 13863, Arlington, Texas 76013, (817) 461-7242.

Supreme Not for Sale

The bull pictured in the advertisement on page 177 of the February ANGUS JOURNAL was mislabeled as HR King Superior. He is HR King Supreme, owned by T.T. Tauper, Samuels, Idaho, and High Hills Angus, Soap Lake, Wash. He is not for sale.